COMP90007 Internet Technologies Assignment 1
Semester 1, 2021
Due date: April 1st 11am

This assignment is worth **5% of the total marks** for the subject. This assignment has 4 questions. The weighting of each question is shown beside the question. Answers must be **submitted as a PDF file via the COMP90007 Assignment 1 submission form in the LMS which will open close to the submission time**. We only accept electronically generated answers, so no handwritten notes please. Late submissions will attract a penalty of 10% per day (or part thereof). Please ensure your name, id and username are clearly presented. Submission should only contain the question number and the answer (do not repeat the text of questions in your submission). Please present all steps of the solutions for questions involving calculations and/or derivations. Questions can be answered in a few sentences. Excessively long answers will not be accepted. Some of the questions may not make sense to you at the time of the release of this assignment but will be covered in topics that we see before the assignment deadline.

Note: All questions can be answered by studying the material covered. All work presented should be your original individual effort. This is not a group assignment. It is also important to highlight that these questions form a good test of your abilities in the subject we have seen so far, thus a genuine effort on your side is important to gauge your progress personally at this time in the semester.

Question 1 (1 point)
In a network with a 10-layer architecture and protocol hierarchy, applications generate messages of length *M* bytes. Assuming each layer has a different header size: 20-byte, 20-byte, 20-byte, 100-byte, 30-byte, 20-byte, 40-byte, 60-byte, 80-byte and 150-bytes for Layers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 respectively: What fraction of the network bandwidth is filled with headers? Please show your calculations, derivations, and briefly explain.

Question 2 (1 point)
An image is 4080 x 2040 pixels with 3 bytes/pixel. Assume the image is stored as an uncompressed simple image file. How long does it take to *transmit* this file over a 64-kbps simple modem? How about a 1-Mbps cable modem?

Question 3 (2 points)
Given a generator polynomial of G(x) = x^4 + x + 1 what would be the total final data sent with CRC be for the given input data of 1101101 in bits. Show your work.

Question 4 (1 point)
Briefly discuss the disadvantages of the TCP/IP model in comparison to the OSI model?